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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/696,410

10/25/2000

Dion Calvin Michael Horvat

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7590

09/08/2004

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IP GROUP

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EXAMINER

ZHENG, EVA Y

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/696,410

Applicant(s)

HORVAT ET AL.

Examiner

Eva Yi Zheng

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2, 7-9 and 14-19 is/are allowed.
- 6) ☒ Claim(s) 4, 5 and 12 is/are rejected.
- 7) ☐ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/25/00 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant failed to respond to the Examiner's Office Action item 1 (Oath/Declaration) and item 2 (Specification).

2. Applicant's arguments filed on June 4, 2004, have been fully considered but they are not persuasive. The Examiner has thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

a) Applicant's argument – "Freeburg does not teach or fairly suggest a demodulation technique wherein a first signal and second signal are multiplied to produce a cross-product, wherein the first and second signal are digitized signals".

Examiner's response – Applicant is reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of claims. Applicant failed to claim that the first and second signals are digitized signals. Instead, applicant merely stated that "subsequent steps are performed in the digital signal domain" in the currently amended claim 4. This would have been interpreted as signals are performed in analog domain until digitization. Freeburg et al. disclose a discriminator, which is a demodulation technique, wherein generating an output signal (210 in Fig. 2) by determining the cross product (206 in Fig. 2) of a first signal (202 in Fig. 2) and second delayed signal (204 in Fig. 2), whereby an analog-to-digital convert (212 in Fig. 2) is connect to the output signal. It is understood that the following steps of (212) are

performed in the digital signal domain. Therefore, Freeburg et al. meet every limitations of claim language.

***Oath/Declaration***

3. Applicant is required to enter the correct filing date for claiming foreign priority in the Declaration or Oath. According to application number 2,292,463, the correct filing date should be Dec 17, 1999 instead of Dec 17,2000.

***Specification***

4. The abstract of the disclosure is objected to because on line 2-3, sentence: "The signal if undersampled and quadrature demodulated." is awkward and unclear. Correction is required. See MPEP § 608.01(b).

***Claim Objections***

5. Claim 22 is objected to because of the following informalities: this claim is dependent upon the cancelled claim 20. Suggest change to --The apparatus of claim 19--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2634

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Freeburg et al. (5,950,118).

a) Regarding claim 4, Freeburg et al. disclose a method for demodulating a frequency-modulated signal, comprising: (as shown in Fig. 2)

- generating a first signal by fixing the modulated signal amplitude at a predetermined level, wherein fixing the modulated signal amplitude is performed by applying the signal to a limiting amplifier (202);
- generating a second signal by delaying (204) the first signal;
- generating an output signal (116) by determining the cross product of the first signal and the second signal, wherein generating the first signal comprises the following substeps:
  - applying the signal to a limiting amplifier (202);
  - digitizing the output of the limiting amplifier (212);

whereby subsequent steps are performed in the digital signal domain, whereby the output signal is representative of the demodulated signal (abstract).

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freeburg et al. in view of Hattori (5,825,756).

Regarding claim 5, Freeburg et al. disclose all the subject matter as described above except for the specific teaching of a 1-bit adc.

Hattori, on the other hand, disclose a flip-flop acts as a 1-bit analog-to-digital converter (Fig.8).

A 1-bit ADC, also called Delta-Sigma, is a well-known and advanced ADC technologies. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute A/D in the radio receiver by Freeburg et al. with the one-bit AD converted circuit by Hattori for better and more accurate signal conversions.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kammeyer (4,506,228; IDS). in view of Taura et al. (US 6,664,849 B1)

Regarding claim 10, Kammeyer disclose (as shown in Fig. 1)

- digitizing the limited signal using an analog-to-digital converter (55);
- applying the digitized limited signal to a quadrature demodulator to create a first I signal and a first Q signal (as shown in Fig. 1);

- creating a second I signal by delaying the first I signal (61);
- creating a second Q signal by delaying the first Q signal (60);
- generating a first product by multiplying the first I signal by the second Q signal (62);
- generating a second product by multiplying the first Q signal the second I signal (63);
- subtracting the second product from the first product to generate the demodulated signal (64), wherein the second I signal and the second Q signal are each delayed by one sample.

Kammeyer disclose all the subject matter as described above except for the specific teaching of a limiting amplifier.

Taura et al. in the same field of endeavor, discloses amplifying the modulated signal using a limiting amplifier (block 6 Fig 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the FM detector by Kammeyer with the limiter amplifier by Taura et al in order to have constant amplitude of IF signal, converted to digital signal, and then demodulated with better quality.

***Allowable Subject Matter***

4. Claims 2, 7-9, 14-16 and 17-19 are allowed.
5. The following is an examiner's statement of reasons for allowance:

None of the prior art teaches or suggests that a phase angle between a first and a second delayed signal is less than 0.2 pi. In additional, a data slicer coupled to the output of a demodulated signal comprises a reference level by a low pass filter, and compare the demodulated signal with the reference signal.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Yi Zheng whose telephone number is (571) 272-3049. The examiner can normally be reached on 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-879-9306.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

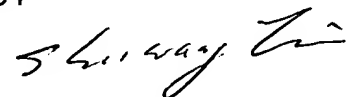
**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Eva Yi Zheng  
Examiner  
Art Unit 2634

August 26, 2004



**SHUWANG LIU  
PRIMARY EXAMINER**